

Particulate Filtration Efficiency Test Report

Manufacturer: Vitacore Industries Inc.

Respirator Model Tested: CAN99-9500

Report Date: 08/03/2021

1. Executive Summary

Twenty CAN99-9500 respirators were tested for Particulate Filter Efficiency in accordance with test method TEB-APR-STP-0059¹. Three respirators were selected at random and subjected to a 200 mg NaCl loading test. The respirators were identified as Type 1, and the remaining 17 respirators were assessed for initial filtration efficiency. All tested CAN99-9500 respirators exhibited particulate filtration efficiency greater than 95% (Table 2).

2. Sample Description

Table 1. Sample and testing information.

Sample Name	Number of Samples	Analysis ID	Test Date
CAN99-9500	20	210802-CAN99-9500-A	08/02/2021

3. Test method

The Particulate Filter Efficiency (PFE) testing was performed in accordance with NIOSH Procedure TEB-APR-STP-0059 on a TSI[®] CERTITEST[®] Automated Filter Tester Model 8130 (Serial No.: 8130163502). Respirators were challenged by a NaCl aerosol which had been neutralized to the Boltzmann equilibrium state at $25 \pm 5^\circ\text{C}$ and $30 \pm 10\%$ relative humidity. The particle size distribution was verified to be a count median diameter of $0.075 \pm 0.020 \mu\text{m}$, and A geometric standard deviation not exceeding 1.86. The aerosol concentration was not exceeding 200 mg/m^3 .

The respirators were pre-conditioned at $85 \pm 5\%$ relative humidity and $38 \pm 2.5^\circ\text{C}$ for 25 ± 1 hours before testing. The challenge flow rate was checked for stability for at least 30 seconds prior to testing. Respirators were mounted on holders by hot melt glue to prevent leakage around the filter holder.

Three respirators were chosen randomly from the 20 submitted samples and subjected to a 200 mg NaCl aerosol loading level, at the challenge flow rate of 85 Lpm. The penetration of the first 3 samples was measured, recorded, and printed at approximately 1-minute intervals during the test period. The highest

penetration observed throughout the test of each filter was recorded as the maximum penetration of that respirator. Based on the results of the 3 respirators (PFE vs. Time graph), the respirators were identified as a Type I, so the remaining 17 samples were assessed for initial filtration efficiency. The maximum filter penetration for each of the 20 samples was determined and record on the data sheet provided below.

4. Results

All samples exhibited minimum PFE% over 95% (Table 2).

Table 2. Test result summary for twenty CAN99-9500 Respirators according to NIOSH Method TEB-APR-STP-0059, including initial inhalation resistance, maximum penetration and PFE%.

Sample ID	Initial Inhalation Resistance (mmH₂O)	Initial Penetration (%)	Maximum Penetration (%)	Maximum Allowable Penetration (%)	PFE (%)	PASS / FAIL
210802-CAN99-9500-A-1	13.5	0.093	0.113	5.000	99.887	Pass
210802-CAN99-9500-A-2	14.3	0.080	0.080	5.000	99.920	Pass
210802-CAN99-9500-A-3	14.7	0.089	0.100	5.000	99.900	Pass
210802-CAN99-9500-A-4	14.1	0.032	0.032	5.000	99.968	Pass
210802-CAN99-9500-A-5	13.9	0.038	0.038	5.000	99.962	Pass
210802-CAN99-9500-A-6	13.9	0.100	0.100	5.000	99.900	Pass
210802-CAN99-9500-A-7	14.9	0.018	0.018	5.000	99.982	Pass
210802-CAN99-9500-A-8	13.8	0.219	0.219	5.000	99.781	Pass
210802-CAN99-9500-A-9	14.5	0.028	0.028	5.000	99.972	Pass
210802-CAN99-9500-A-10	13.7	0.188	0.188	5.000	99.812	Pass
210802-CAN99-9500-A-11	14.6	0.111	0.111	5.000	99.889	Pass
210802-CAN99-9500-A-12	13.8	0.270	0.270	5.000	99.730	Pass
210802-CAN99-9500-A-13	14.0	0.026	0.026	5.000	99.974	Pass
210802-CAN99-9500-A-14	13.6	0.315	0.315	5.000	99.685	Pass
210802-CAN99-9500-A-15	14.5	0.243	0.243	5.000	99.757	Pass
210802-CAN99-9500-A-16	14.1	0.197	0.197	5.000	99.803	Pass
210802-CAN99-9500-A-17	14.3	0.263	0.263	5.000	99.737	Pass
210802-CAN99-9500-A-18	14.2	0.022	0.022	5.000	99.978	Pass
210802-CAN99-9500-A-19	13.3	0.320	0.320	5.000	99.680	Pass
210802-CAN99-9500-A-20	13.8	0.051	0.051	5.000	99.949	Pass

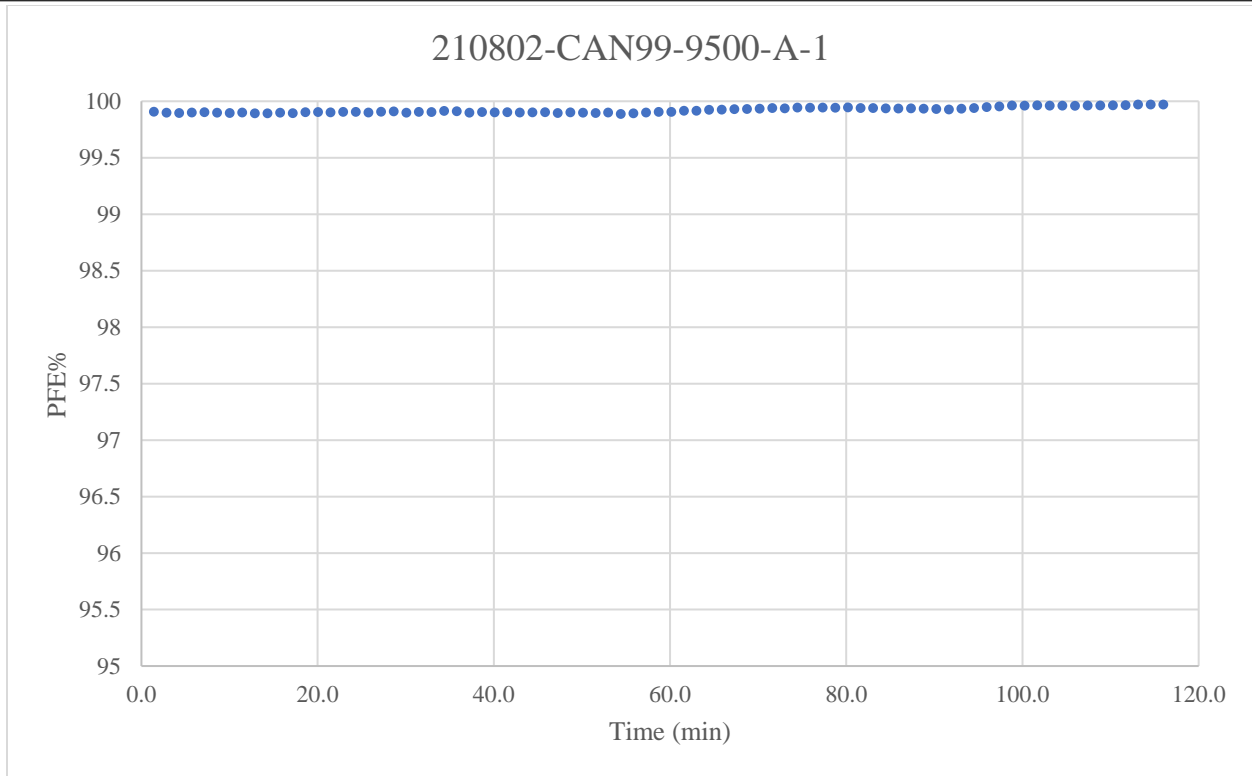


Figure 1. Particulate Filtration Efficiency over time for a 200 mg NaCl loading test according to NIOSH Method TEB-APR-STP-0059 for Sample ID 210802-CAN99-9500-A-1.

Table 3. Loading test data including flow rate, inhalation resistance, penetration, PFE and NaCl mass loading according to NIOSH Method TEB-APR-STP-0059 for Sample ID 210802-CAN99-9500-A-1.

Run Time (min)	Flow Rate (Lpm)	Inhalation Resistance (mm H ₂ O)	Penetration (%)	PFE (%)	NaCl Mass Loading (mg)
1	85.2	13.5	0.093	99.907	2.5
10	85.3	16.3	0.105	99.895	17.3
20	84.4	20.2	0.096	99.904	34.3
30	84.9	28.8	0.102	99.898	51.7
40	85.1	44.5	0.099	99.901	69.1
50	85.2	70.1	0.102	99.898	86.5
60	85.1	95.8	0.094	99.906	103.7
70	84.7	121.0	0.067	99.933	120.4
80	84.7	145.6	0.055	99.945	137.6
90	84.2	151.8	0.069	99.931	153.9
100	84.7	151.8	0.039	99.961	172.0
110	84.4	151.8	0.036	99.964	188.5
116	85.0	151.8	0.029	99.971	199.7

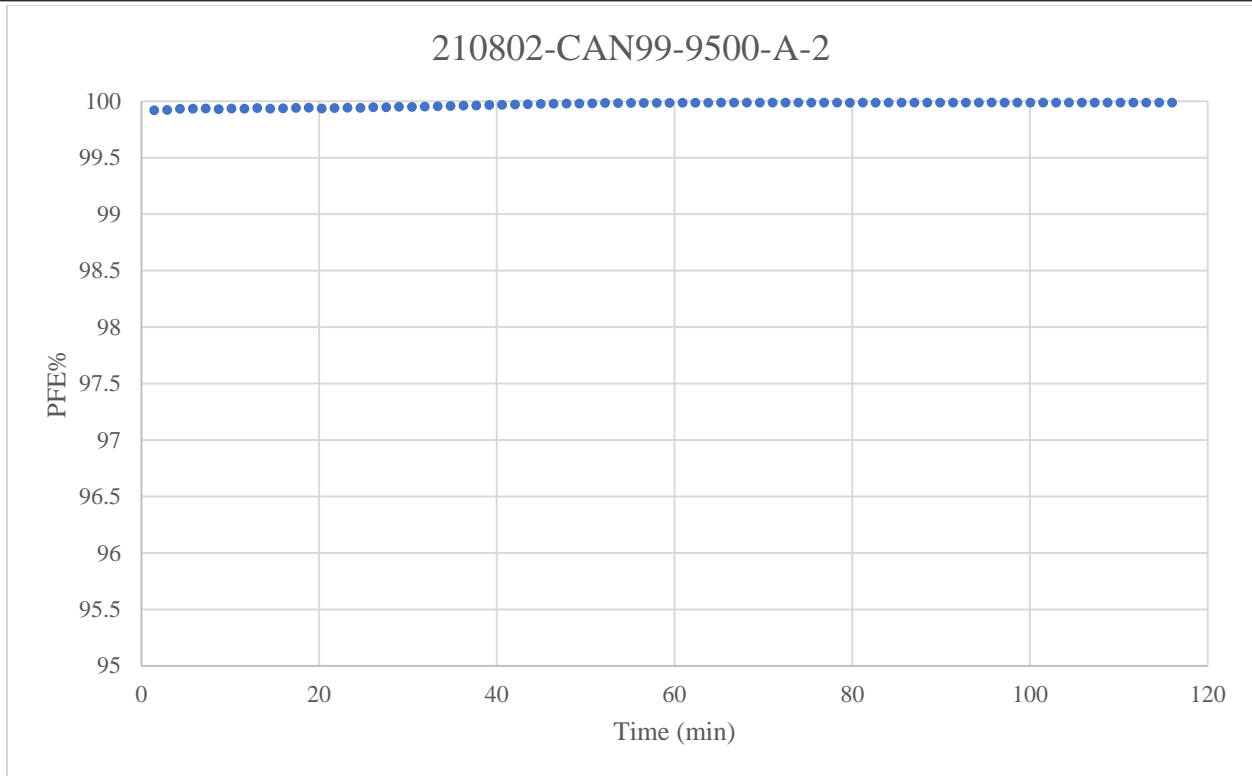


Figure 2. Particulate Filtration Efficiency over time for a 200 mg NaCl loading test according to NIOSH Method TEB-APR-STP-0059 for Sample ID 210802-CAN99-9500-A-2.

Table 4. Loading test data including flow rate, inhalation resistance, penetration, PFE and NaCl mass loading according to NIOSH Method TEB-APR-STP-0059 for Sample ID 210802-CAN99-9500-A-2.

Run Time (min)	Flow Rate (Lpm)	Inhalation Resistance (mm H ₂ O)	Penetration (%)	PFE (%)	NaCl Mass Loading (mg)
1	85.2	14.3	0.080	99.92	2.5
10	85.1	17.3	0.065	99.935	17.5
20	85.4	23.5	0.065	99.935	35.1
30	85.2	37.2	0.051	99.949	52.5
40	85.7	64.9	0.033	99.967	70.5
50	85.5	97.8	0.019	99.981	87.9
60	85.0	131.6	0.014	99.986	104.8
70	85.1	151.9	0.013	99.987	122.5
80	84.7	151.9	0.013	99.987	139.3
90	84.6	151.9	0.013	99.987	156.5
100	84.4	151.9	0.013	99.987	171.0
110	84.2	151.9	0.013	99.987	187.9
116	84.2	151.9	0.012	99.988	197.8

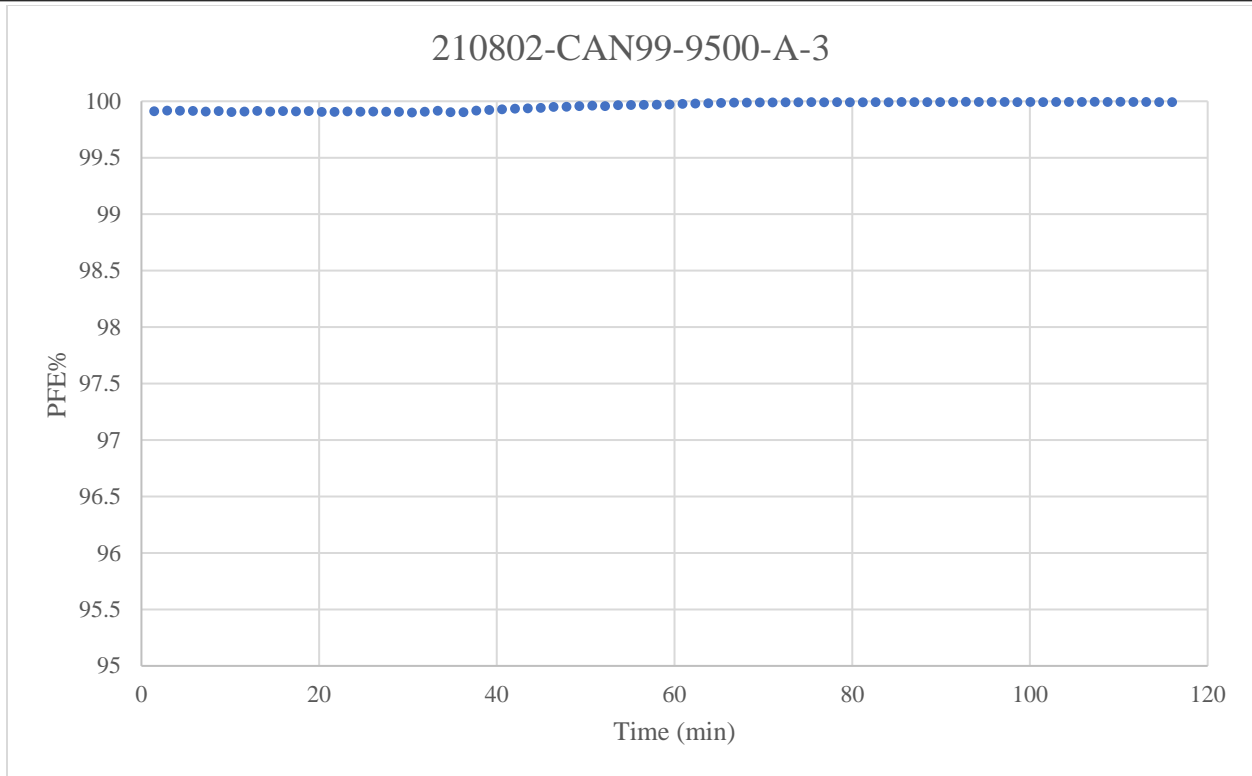


Figure 3. Particulate Filtration Efficiency over time for a 200 mg NaCl loading test according to NIOSH Method TEB-APR-STP-0059 for Sample ID 210802-CAN99-9500-A-3.

Table 5. Loading test data including flow rate, inhalation resistance, penetration, PFE and NaCl mass loading according to NIOSH Method TEB-APR-STP-0059 for Sample ID 210802-CAN99-9500-A-3.

Run Time (min)	Flow Rate (Lpm)	Inhalation Resistance (mm H ₂ O)	Penetration (%)	PFE (%)	NaCl Mass Loading (mg)
1	84.6	14.7	0.089	99.911	2.5
10	85.8	18.5	0.096	99.904	17.6
20	86.0	26.1	0.095	99.905	35.4
30	85.9	42.5	0.100	99.900	53.0
40	86.0	74.2	0.072	99.928	70.7
50	85.8	107.8	0.039	99.961	88.2
60	85.6	151.9	0.024	99.976	105.6
70	85.3	151.9	0.011	99.989	120.2
80	85.0	151.9	0.009	99.991	137.3
90	84.8	151.9	0.008	99.992	154.4
100	84.5	151.9	0.007	99.993	171.2
110	84.0	151.9	0.006	99.994	187.5
116	84.0	151.9	0.008	99.992	197.4

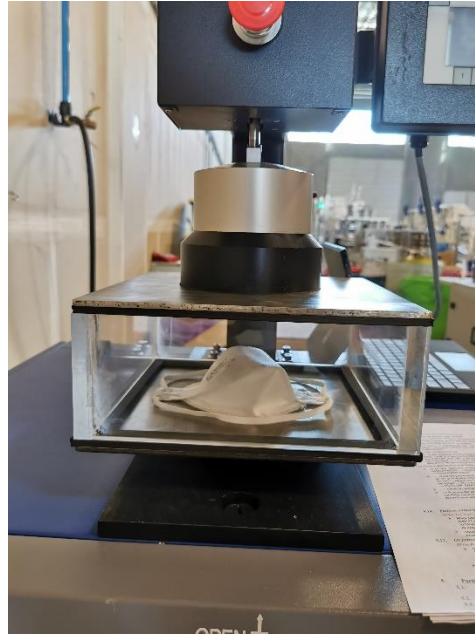


Figure 4. CAN99-9500 Respirator under test using a TSI® CERTITEST® Automated Filter Tester Model 8130.

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These data are representative of only the samples tested.

References

1. National Institute for Occupational Safety and Health. Determination of Particulate Filter Efficiency Level for N95 Series Filters against Solid Particulates for Non-Powered, Air Purifying Respirators Standard Test Procedure TEB-APR-STP-0059 Revision 3.2. 2019.